

School Zone Flashers in Indianapolis, Indiana

March 7, 2018

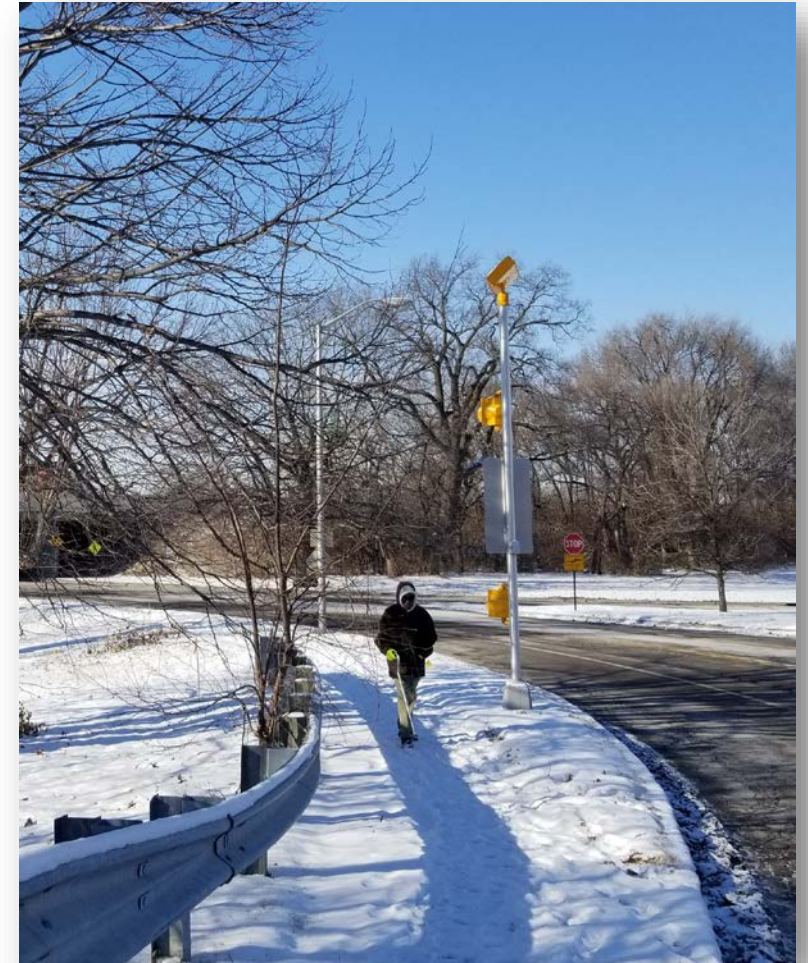


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Today's Presentation

- Case Study
 - Project Initiation
 - Design
 - Construction
 - Maintenance
- Lessons Learned



Project Initiation

- Outdated & Conflicting Legislation
 - Original 1975 ordinance with minor revision in 2001
 - Reduced speed zone in effect from 7:00AM to 4:30PM School Days
 - Exact dimensions of zones based upon school property lines and posted speed limits



Project Initiation

- Outdated & Conflicting Signs
 - Many school zone signs did not use the fluorescent yellow/green placard
 - How the Department addressed the end of school zones was inconsistent



Project Initiation

- Observed non-compliance of motorists
 - General disregard to school zones
 - Motorists unsure of year round or balanced calendars
 - 9.5 hours per day of reduced speeds many of which there were no children present



Project Initiation

- How did we solve these problems?
 - Total revamp of school zone infrastructure
 - Applied for Highway Safety Improvement Program (HSIP) funds
 - Hired Shrewsberry & Associates to help evaluate need of nearly 400 schools.



School Flashers

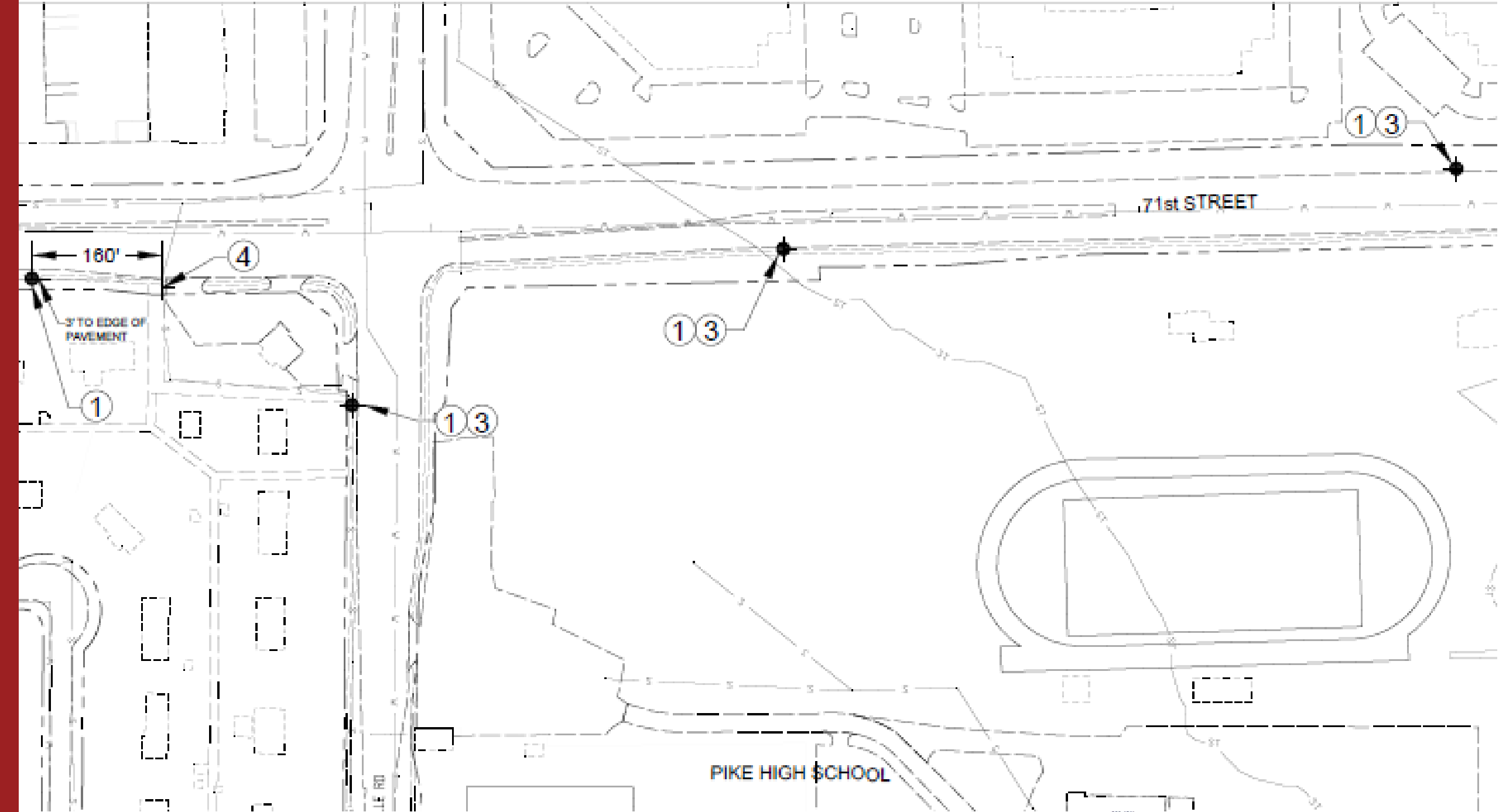
- School Zone Speed Reduction Flashers
- Rectangular Rapid Flashing Beacons (RRFB)



Design Phase

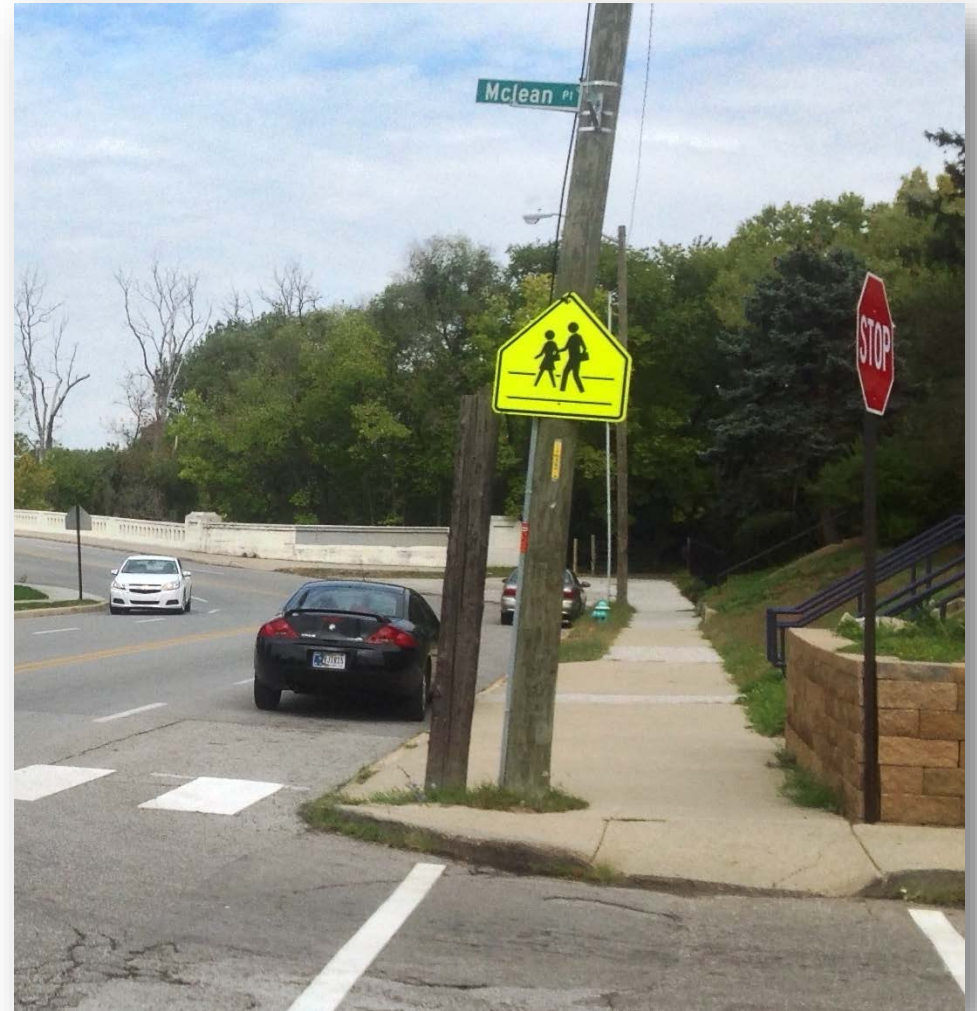
- Design Procedure
 - IMAGIS base maps
 - Field measurements
 - Placement of flashers per ordinance
 - Detail and specifications for RRFB





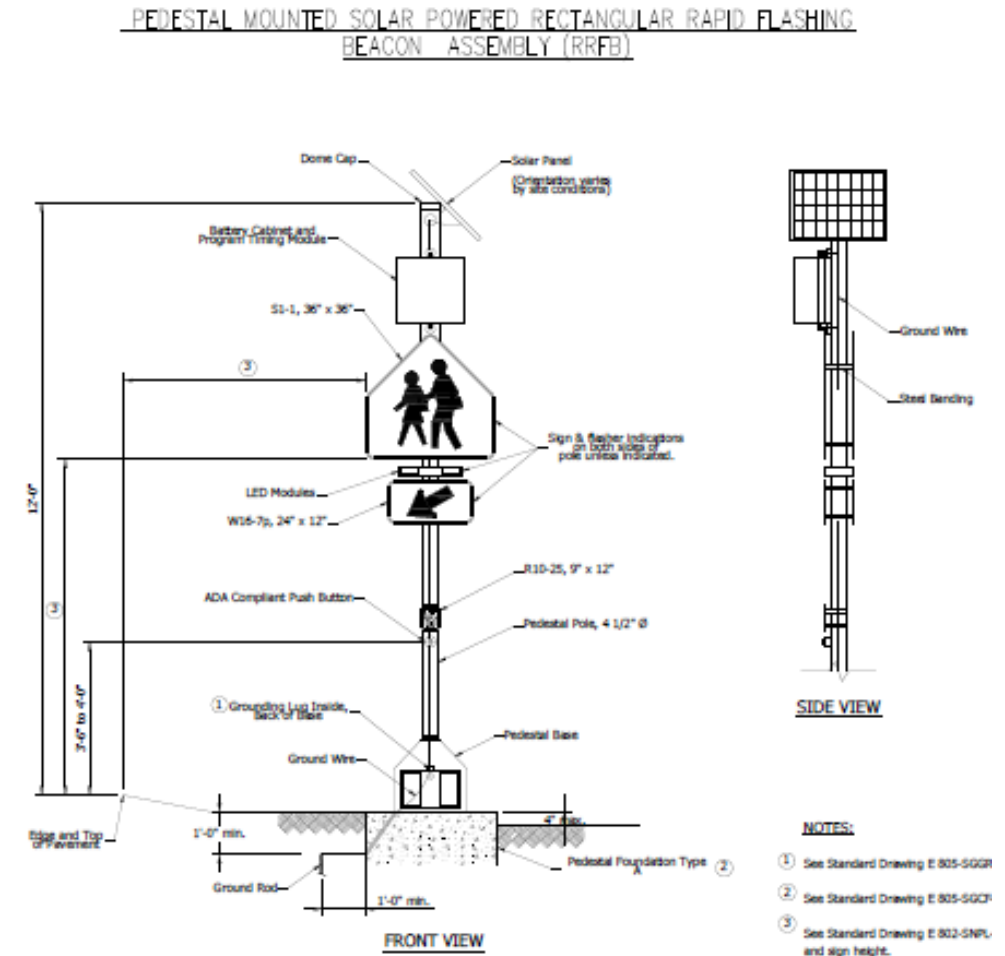
Design Phase

- Design Challenges
 - Schools closing, temporary schools, schools for adults
 - ROW constraints
 - Posted speed is 25 mph
 - ADA
 - Constructability issues
 - Schedule/funding



Contract Documents

- Plans, quantities, estimates
- PCE for phase 1,2
 - PCE + RFI for phase 3
- Plat maps for phase 1,2
 - ROW cert for phase 3
- Proprietary materials phase 3
- Unique Special Provisions:
 - Speed flasher specs
 - RRFB specs package
 - "Modification" of speed flasher
 - Spare parts package



Metrics

	Speed	RRFB	Total
Phase 1	166	32	198
Phase 2	240	20	260
Phase 3	110	24	134
Total	516	76	592

Final Cost:

CN \$4,490,000

PE 4.2%

INSP 12.7%

Total \$5.25 M

\$8,871/flasher



Construction Phase

- 3 separate projects were bid through INDOT using HSIP funds
- With 1 design firm, 2 contractors, and 2 inspection firms we have installed nearly 600 flashing beacons to date.
- Different methods of construction utilized
 - Traditional on-site foundation pour
 - Off-site foundation construction



Remote Programming & Monitoring

Issues:

- Programming requires site visit x 516 each year
- No way to adjust for weather events
- Rely on reports of malfunctions



Remote Programming & Monitoring

Solutions from RTC:

- AP22 Time Switch
- M2M Cellular Modem
- Guardian
- RTC Connect



*Upload and download
programming via
2-Way Radio, Cellular,
Ethernet, or Laptop.*





Delay / Overrides

Disable Map

Show Calendar

Utilities

- ☒ MG 1 'Center Township'
- ☒ MG 2 'Warren Township'
- ☒ MG 3 'Franklin Township'
- ☒ MG 4 'Perry Township'
- ☒ MG 5 'Decatur Township'
- ☒ MG 6 'Wayne Township'
- ☒ MG 7 'Pike Township'
- ☒ MG 8 'Washington Township'
- ☒ MG 9 'Lawrence Township'
- ☒ Master Group 10

Master Group Selection

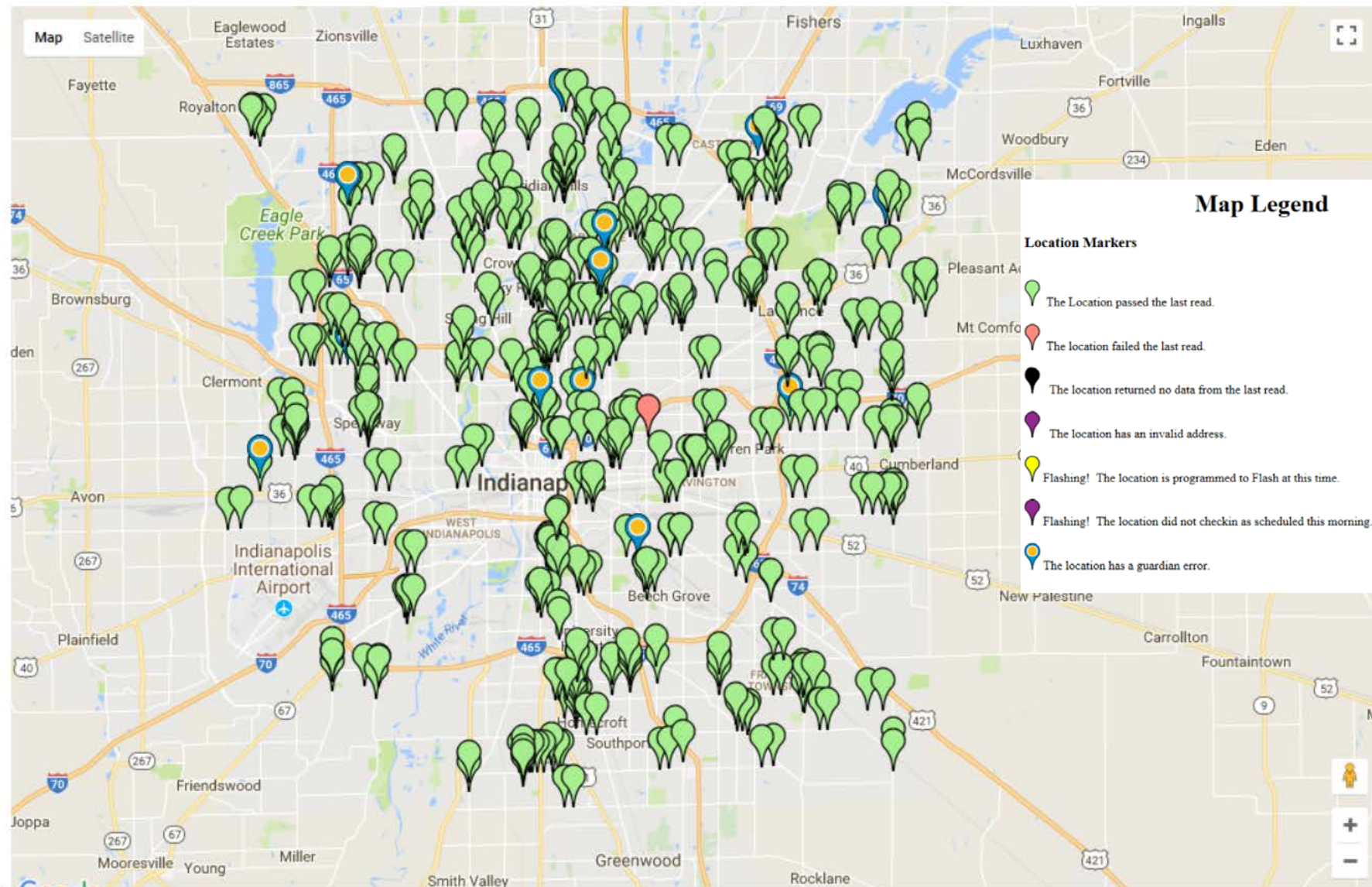
< Show All >

☐ Show Map Errors Only

RTC Connect Map:

Current Guardian Alerts: 12

Show Alerts





- MG 1 'Center Township'
- MG 2 'Warren Township'
- MG 3 'Franklin Township'
- MG 4 'Perry Township'
- MG 5 'Decatur Township'
- MG 6 'Wayne Township'
- MG 7 'Pike Township'
- MG 8 'Washington Township'
- MG 9 'Lawrence Township'
- Master Group 10
 - Morphy, 1
 - Master Group 10 Group Number 1
 - Computer Programming
 - Locations
 - Office, 1
 - Master group 10: Group Number 1 Location Number 1
 - Latitude = 39.7869839. Longitude = -86.101497
 - IP address: 192.168.1.1
 - Location read not completed yet.
 - Test Group 10, 3

Delay / Overrides

Disable Map

Show Calendar

Utilities



Master Group Selection

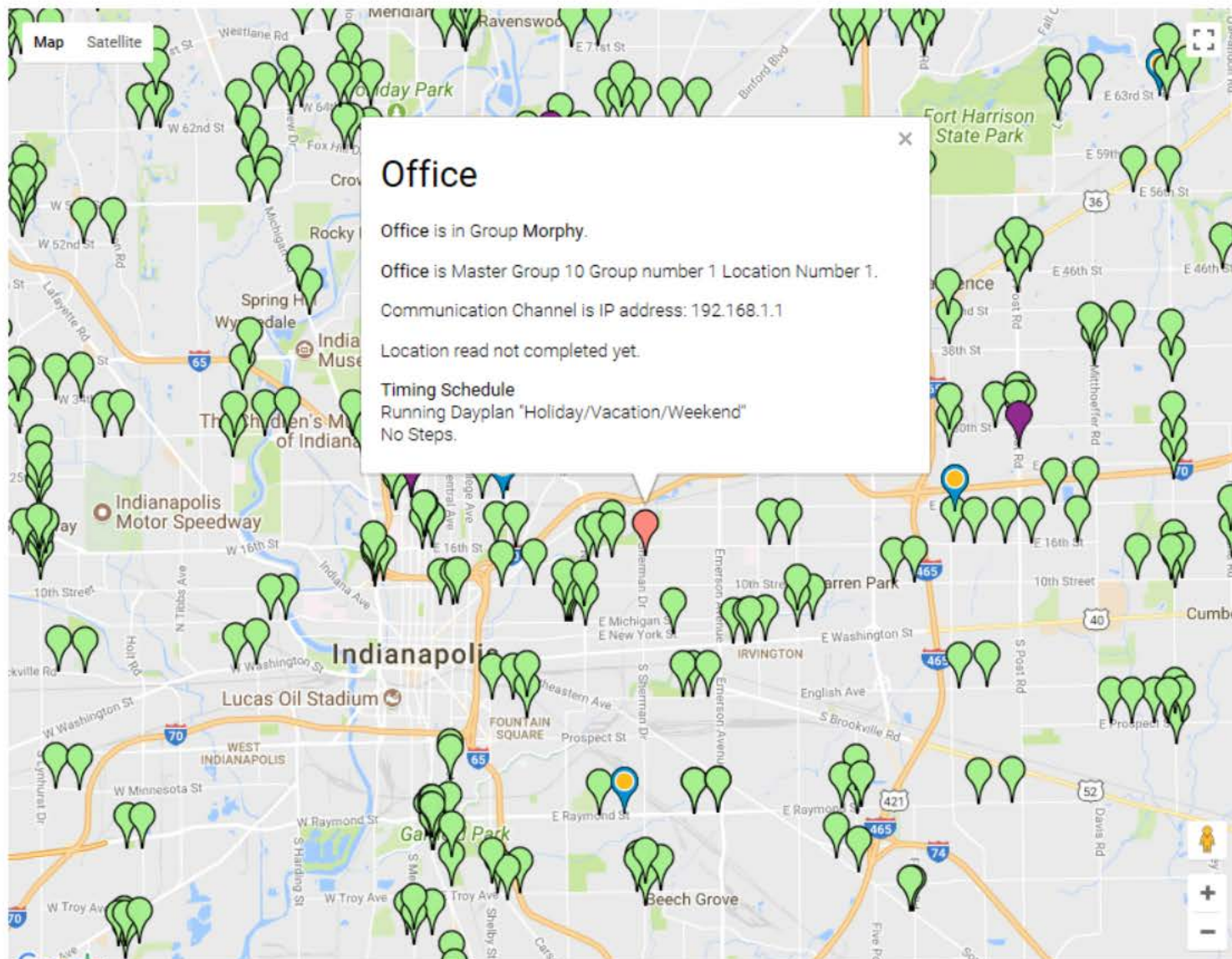
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Show Map Errors Only

RTC Connect Map. 'Office'

Current Guardian Alerts: 12

Show Alerts





ions

N Illinois St - NB - 2, 1

- Master group 1; Group Number 33 Location Number 1
- Latitude = 39.798. Longitude = -86.1591
- IMSI number: 310410917000843. Time Switch Type = CP22 3G Data.
- Time Switch Status.
 - Time Switch Time = 2/23/2018 3:15:09 AM.
 - Status Read Attempt Time = 2/23/2018 3:14:24 AM.
 - IMSI number: 310410917000843.
 - Cell DB = -71.
 - Relay Status = OFF at 2/23/2018 3:15:09 AM
 - Last Powerup = 8/8/2017 8:17:53 AM.
 - Last Download = 8/18/2017 3:15:22 AM.
 - Latitude from Clock 39.798
 - Longitude from Clock -86.1591
 - Firmware in clock 320NA
- Location read at 2/23/2018 3:15:13 AM
- Relay Status OFF.
- Time Switch Time is Correct
 - Time Switch Time = 2/23/2018 3:15:11 AM.
 - Computer Time = 2/23/2018 3:15:13 AM.
- Typical School Week
 - S - None.
 - M - Normal.
 - T - Normal.
 - W - Normal.
 - T - Normal.
 - F - Normal.
 - S - None.
- Day Plans
 - Normal
 - 7:00 AM Relay = ON
 - 9:00 AM Relay = OFF
 - 3:30 PM Relay = ON
 - 5:30 PM Relay = OFF
- Calendar Events
 - "Holiday", 8/28/2017.
 - "Holiday", 9/4/2017.
 - "Holiday", 10/2/2017 to 10/15/2017
 - "Holiday", 11/20/2017 to 11/26/2017
 - "Holiday", 12/22/2017 to 1/7/2018
 - "Holiday", 1/15/2018.
 - "Holiday", 2/19/2018.
 - "Holiday", 3/19/2018 to 4/1/2018
 - "Holiday", 5/14/2018.
 - "Holiday", 5/28/2018.
 - "Holiday", 6/6/2018 to 7/29/2018

N Illinois St - NB - 2, 1

- Delay / Overrides
- Disable Map
- Show Calendar
- Utilities

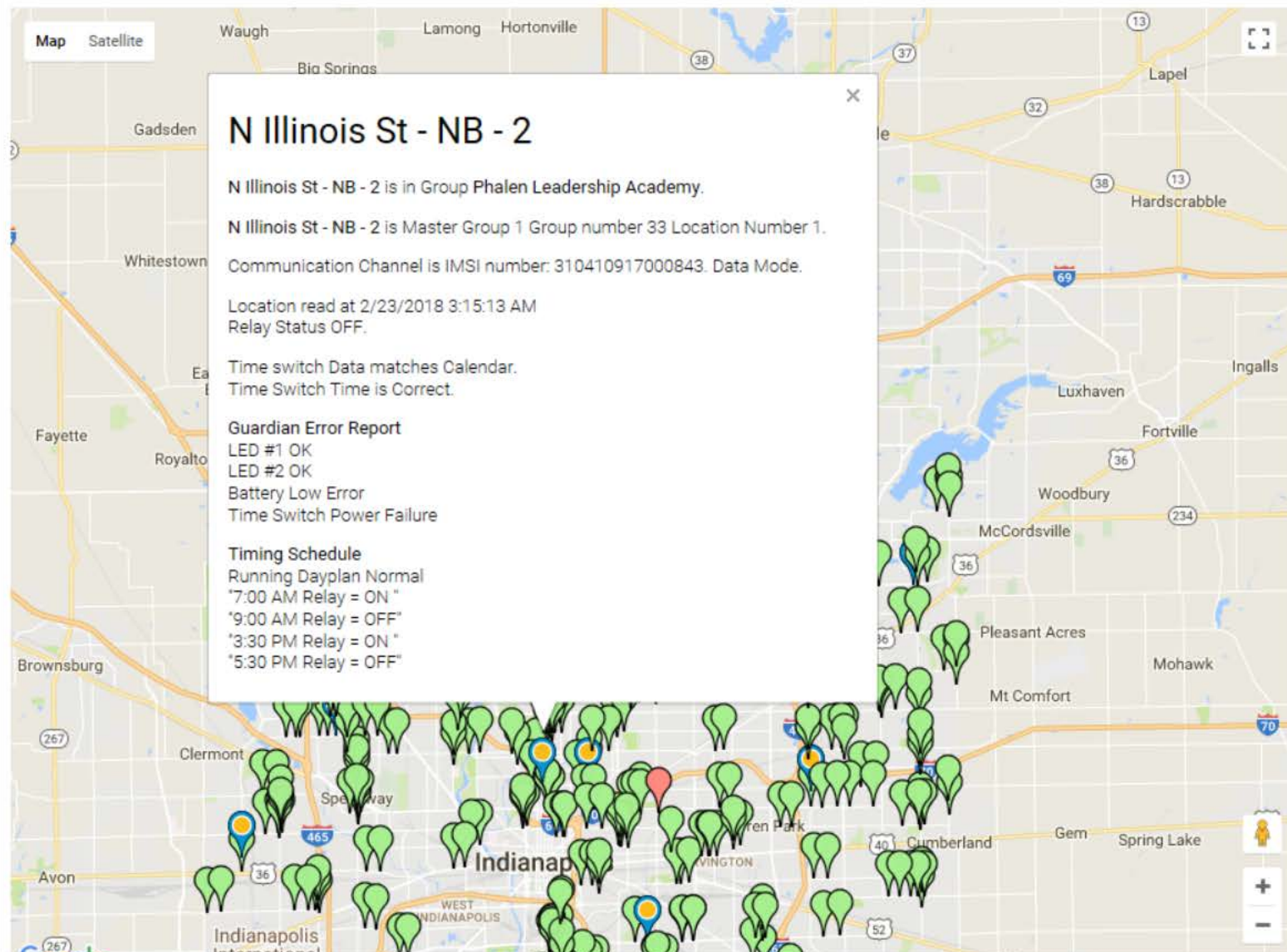


- Master Group Selection
- < Show All >
- Show Map Errors Only

RTC Connect Map. 'N Illinois St - NB - 2'

Current Guardian Alerts: 12

Show Alerts





RTC Connect Edit Dayplans and Steps



Select A Group

Heritage Christian School (9,1)
Skiles Test Elementary (9,2)
Crestview Elementary School (9,3)
Sunnyside Elementary School (9,4)
Fall Creek Valley (9,5)
Forest Glen School (9,6)
Cathedral High School (9,7)
Cornerstone Baptist Indian Creek E
Winding Ridge Elementary School (
Turning Point Schools (9,10)
Monument Lighthouse Charter Scho
Amy Beverland Elem School (9,12)
Arlington High School (9,13)
Lawrence Central High School Bel
Lawrence North High School (9,15)
St. Lawrence School (9,16)
St. Simon Holy Cross (9,17)
Hope Academy (9,18)
Mary Evelyn Castle Elem School (9,

Master Group Selection

MG 9 ' Lawrence Townshi ▾

Available Dayplans

Normal
Override

Edit Dayplan

Delete Dayplan

Add Dayplan

Finished

Edit Step

7:00 AM Relay = ON
9:00 AM Relay = OFF
2:05 PM Relay = ON
4:05 PM Relay = OFF

Edit Step

Copy Steps

Delete Step

Paste Steps

Add Step



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Select A Group

Indpls Metropolitan HS (1,2)
 Emmerich Manual High School
Emma Donnan Middle School
 Tindley Genesis (1,5)
 Capitol City Seventh Day Adv
 Herron High School (1,7)
 Margaret McFarland Alternativ
 Louis B. Russell Jr. School 48
 Joyce Kilmer Academy 69 (1,1
 Thomas D. Gregg School 15 (1
 Christian Park School 82 (1,15
 Paul I. Miller School 114 (1,16
 Christel House Academy (1,17
 Shortridge High and St Richar
 Holy Angels Catholic School (1
 Paramount School of Excellen
 Ralph Waldo Emerson School
 Henry W Longfellow Middle S
 William McKinley School 39 (1
 Center for Inquiry (1,27)
 Crispus Attucks Medical Magn
 Francis W. Parker School 56 (1
 Indianapolis Academy of Exce
 James A. Garfield School 31 (1
 Kipp Indy Public School (1,32)
 Phalen Leadership Academy (1
 Riverside High School (1,34)
 St Philip Neri Catholic School
 The Oaks Academy Middle Sc
 Theodore Potter #74, Horizon
 William A. Bell School #60 (1,
 John Marshall Community High

Master Group Selection

< Show All >

Active Group You Are Editing:
 Emma Donnan Middle School Central



Previous Calendar

Select View

Show 9 Month

Select Date Range

2/ 1/2018

Next Calendar



Dayplans for Emma Donnan Middle School

...	Holiday
...	Vacation
+	Normal
...	Unassigned
+	Emma Donnan No School
+	Central Catholic No School
...	Unassigned
...	Unassigned
...	Unassigned
...	Unassigned
+	Override

Typical School Week

Sunday	None
Monday	Normal
Tuesday	Normal
Wednesday	Normal
Thursday	Normal
Friday	Normal
Saturday	None

Central Catholic School (1,4)

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28			

May 2018

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6	7	8	9	10	11	12
13	14	15	16	17	18	19
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27	28	29	30	31		

August 2018

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March 2018

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18	19	20	21	22	23	24
25	26	27	28	29	30	31

June 2018

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September 2018

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April 2018

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July 2018

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October 2018

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28	29	30	31			

Copy Paste

Clear Calendar

Undo

Finished

Select A Group

Bishop Chatard Christ The King
International School of Indiana
Northview Middle School (8,3)
Park Tudor School (8,4)
St. Thomas Aquinas (8,5)
Floro Torrence School 83 (8,6)
Nora Elementary School (8,7)
North Central High School (8,8)
Allisonville Elementary School
Spring Mill Elementary (8,10)
Greenbriar Elementary (8,11)
Westlane Middle School (8,12)
Indiana School for the Blind (8,
Indiana Math and Science Ac
St Pius X Catholic School (8,1
Colonial Christian School (8,16
Eastwood Middle School (8,17
St Matthew Catholic School (8,
Sidener Academy for High Abi
John Strange Elementary Sch
Crooked Creek Elementary Sc
St. Monica Catholic School (8
Tindley Renaissance Academ
Center for Inquiry & Immaculat
Eliza A Blaker School 55 (8,25
Fox Hill Elem School (8,26)
Hasten Hebrew Academy (8,2
Indiana School for the Deaf (8
International School of Indiana
Mary E. Nicholson School 70
The Orchard School (8,31)
Rousseau McClellan School 9

Master Group Selection

MG 8 Washington Towns

Active Group You Are Editing:
Bishop Chatard Christ The King School



Previous Calendar

Select View

Show 9 Month

Select Date Range

2/ 1/2018



Next Calendar

Dayplans for Bishop Chatard Christ The King School (8,1) 2018

Holiday
Vacation
Normal
Monday Plan
Friday Plan
Early Dismissal/BCHS Mon
Early Dismissal/BCHS Normal
Early Dismissal/BCHS Fri
Good Friday
Unassigned
Override

Typical School Week

Sunday None
Monday Monday Plan
Tuesday Normal
Wednesday Normal
Thursday Normal
Friday Friday Plan
Saturday None

S	M	T	W	T	F	S
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27	28	29	30	31		

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21	22	23	24	25	26	27
28	29	30	31			

Copy Paste

Clear Calendar

Undo

Finished

Lessons Learned

Project Initiation:

- Calendar research/programming
- Coordination with Council re: ordinance
- Communication with schools



2017-18 School Year Calendar

JULY						
S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

SEPTEMBER						
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23	24	25	26	27	28	29
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NOVEMBER						
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JANUARY						
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30	31					

MARCH						
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23	24	25	26	27	28	29
30	31					

MAY						
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16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

AUGUST						
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23	24	25	26	27	28	29
30	31					

OCTOBER						
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30	31					

DECEMBER						
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30	31					

FEBRUARY						
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APRIL						
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JUNE						
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23	24	25	26	27	28	29
30						

First Semester	
Monday, July 31	First Day
Tuesday, September 5	Professional Development
Wednesday, September 27	Parents in Touch Day
Mon, Oct 2 - Fri, Oct 13	Fall Break
Monday, October 16	Professional Development
Wed, Nov 22 - Fri, Nov 24	Thanksgiving Break
Thursday, December 14	Last Day of 1st Semester
Friday, December 15	Semester Close (Flex day)

Second Semester	
Tuesday, January 2	First Day
Tuesday, January 16	Professional Development
Mon, Mar 19- Fri, Mar 23	Spring Break (Flex days)
Mon, Mar 26 - Fri, Mar 30	Spring Break (guaranteed)
Thursday, June 7	Last Student Day
Friday, June 8	Yearly Close
Mon, June 11 - Fri, June 29	Summer School Session

Professional Development Days	
All instructional personnel report.	Students DO NOT attend.
School Opening Preparation Days	
All school-based employees attend to prepare for the opening of school. School staff meetings, full teacher workday.	
Days of Student Attendance	
Parents in Touch Day	
Holidays	
Holiday pay distributed according to employee group contract.	
Records and Close-out	
Flex Days	
As needed to make up days of school closure.	
Break	
Summer School	
Summer Break	

Summary of Days	
Students	
Semester 1	82
Semester 2	98
Total	180
Staff	
PD days	4
Workdays	4
Student days	82
Semester 1	90
PD days	1
Workdays	1
Student days	98
Semester 2	100
Total	190

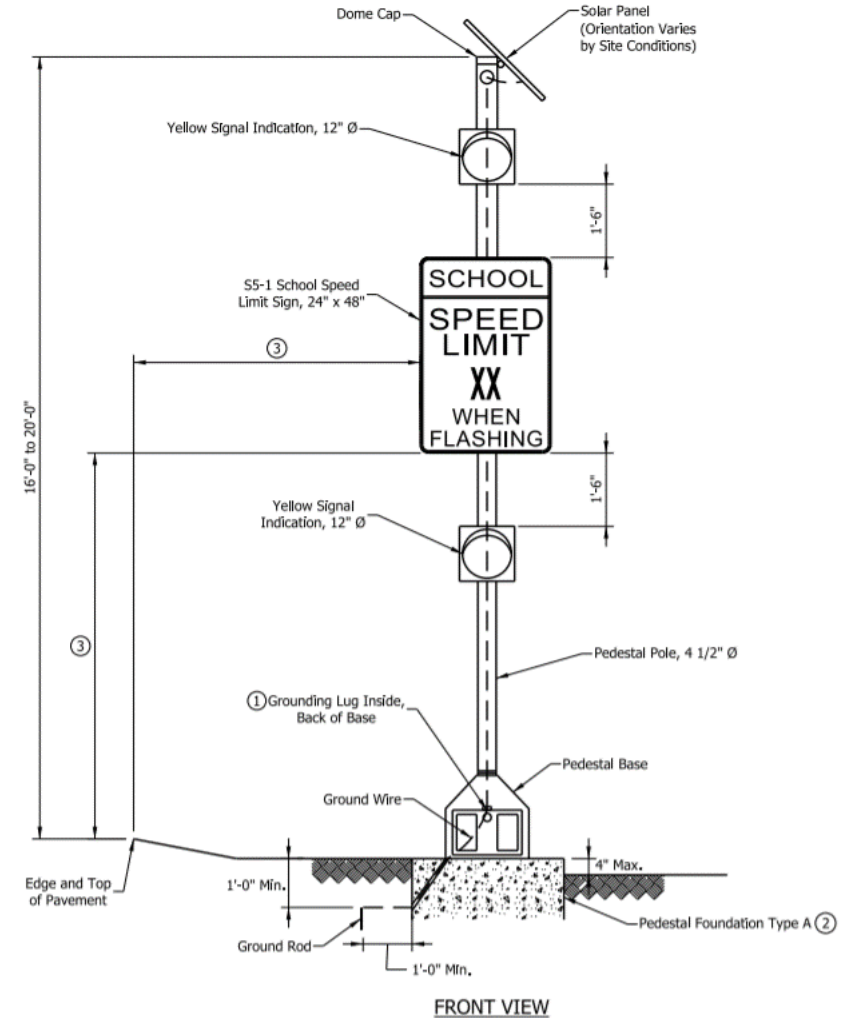
SY 2017-18 Calendar [updated 7.11.2017]



Lessons Learned

Design Phase:

- Cost estimating
- 2nd beacon was optional
- Submittal document changes – ROW, PCE
- RRFB approval revoked



Lessons Learned

Construction Phase:

- Ensure contractors and inspectors have correct equipment
 - Laptops w/ internet access
- Solar Limitations
 - Unobscured view of sky
- Neighborhood complaints
 - NIMFY



Lessons Learned

Maintenance Phase:

- Adequate replacement parts
 - Improvement Rich -vs- Maintenance Poor
- “Manual mode” access switch placement
 - Unintended consequences of standards modification
- Stolen equipment (LED’s, visors, etc...)
 - Location has had 3 separate LED’s “borrowed”
- Knockdowns (intentional and non-intentional)
 - 36 incidents in less than 2 years



QUESTIONS?

Contact Us

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